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504 Lakemead Way
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vol. 24
AUGUST 1980

PAARA

Graphs



palo alto
AMATEUR
RADIO ASSN.

MENLO PARK C.D. RADIO CLUB, K6YQT

SHAVER RADIO, INC.

DAVID SHAVER
K6DTX

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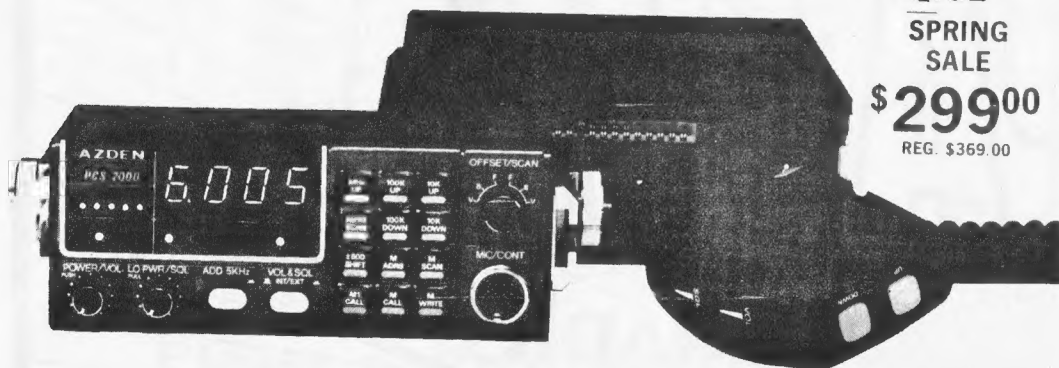
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MICROCOMPUTER CONTROLLED
2 METER FM TRANSCEIVER

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INTRODUCTORY
PRICE

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COMPARE THESE FEATURES
WITH ANY UNIT AT ANY PRICE

- **FREQUENCY RANGE:** Receive and transmit: 144.00 to 147.995 MHz, 5Khz steps + MARS-CAP* and MULTIPLE OFFSET BUILT IN.
- **ALL SOLID STATE-CMOS PL. DIGITAL SYNTHESIZED.**
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- **MICROCOMPUTER CONTROLLED:** All scanning and frequency-control functions are performed by microcomputer.
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- **SIX-CHANNEL MEMORY:** Each memory is re-programmable. Memory is retained even when the unit is turned off.
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- **INSTANT MEMORY-1 RECALL:** By pressing a button on the microphone or front panel, memory channel 1 may be recalled for immediate use.
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- **ACCESSORY OFFSET:** With one optional crystal, three non-standard offsets become available.
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PAARAgaphs is the official organ of
The Palo Alto Amateur Radio Association and the Menlo Park Civil Defense Radio Club

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Members : Ed Fairbanks W6AIN
Swede Swenson N6CHL
Shannon Lile K6TNY
Gerry Wagstaffe W6NIR
Dave Daniel KB6WP
Jock MacKaig N6YV

PAARA POLICIES

Membership in PAARA is \$6.00 per calander year (payable in January) which membership includes a subscription to PAARAgaphs. Interested others may subscribe to PAARAgaphs for \$6.00. Make payment to:

PAARA, P.O. Box 911, Menlo Park, CA 94025

Written contributions to P. O. Box above, or, 1043 Del Norte Av., Menlo Park, CA 94025

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Cover : Sue Lindner L6VLY

REGULAR MEETING

FRIDAY August 1, 1980

7:30 P.M.

Rooms 15 & 17, Menlo Park Recreation Center,
Alma at Mielke Drive
Menlo Park

The scheduled speaker for the August meeting has been on vacation and verification of his availability has not been made. Eric would rather not promise something he can't, but those who have heard who it is to be are looking forward to it. It may be desirable to put the speaker ahead of the business meeting, so be there on time.

Future Club Meetings: September 5, October 10, November 7, December 5.

Auction and Flea Market, October 11

Next Board of Directors Meeting, August 6. All are welcome

PAST CORNER: The only officer in attendance was Gerry, WA6LNV, who opened the meeting by banging a length of extension cord on the front table because no one passed on the gavel.

Introduction of guests and visitors was followed by a Post 599 report of activities. Jim, K7UDG, announced the communication aid to the Western Wheelers and indicated they did a creditable job. He also announced the completion of Post 599's repeater on 145.17, which indicated their activity on 2-meters. The repeater was a necessity because the one they held out on most suggested they find another!

Fred, K6YT, gave a brief description of Field Day. He claimed 5129 contacts (roughly) for the club, of which 40% were on CW. The only casualty was Bob's K6SEM, Atlas which spewed foul smells and smoke in the heat of battle. Fred's photographs were passed around and your editor believes they disappeared one after another. Tail end Charlie didn't get to see them. Fred was presented with a "Yellow Turkey"—being easier to portray in a painting than a "Yankee Tango".

Al, AG6G, gave a description of the Foothill effort and all seemed pleased by it. Cows and weather cooperated this year.

The meeting broke for coffee, cookies and a lot of ragchewing.

Mac, N6YV, gave the Fibre-Optics talk and seemed to enjoy it as much as the 44 who were present. His view-graphs were simple enough to read and understand and his samples of material impressive. His 5-mW laser, which operates with a current density of 20,000 amperes per square centimeter, was almost as impressive as the 624 pair copper cable compared to a pair of .005" silicon fibres of the same data carrying capacity. Theoretical losses in fibers as low as .02 db/km with bandwidth beyond all reason are reputedly some better than RG8-U.

Digital or analog data can be transmitted on fibers but digital seems to be the primary use to date. Mac sees fibers used in coupling digital data in ham communications equipment as one of the upcoming improvements—maybe not the next generation, but soon.

A raffle—all the edibles and take-a-ways supplied by Ed, W6AIN—ended the meeting which broke up a little after 10 with some going down the block to look up into a largely silicon tube closed on top, lowering it and asking for a refill of the golden foamy.
o o o

VISITORS CORNER: Four visitors were present at the July meeting—about the average percentage of attendance. Welcomed were Cliff, KA6JWA, Redwood City, Marry Ann McAdams, NC and Bob Vaughn, NC, Palo Alto, and Stephan, DF4CK, from Purdue University in West Lafayette, Indiana. We hope you enjoyed the meeting and companionship enough to come again next month, when we will know you better and you will get to know a few more of us. Any unmentioned visitors are old faces and, after a while, get to be part of the group.

All guests and visitors should fill out the registration book with complete addresses so we can invite them back.

BOARD CORNER: The Board of Directors met in the replaced Club trailer just inside the guard gate at SRI, off Ravenswood at Laurel Avenue in Menlo Park at 7:30 p.m. Wednesday, July 16.

Those present included Bob, K6SEM, Gerry, WA6LNV, Irene, WB6RAF, Ed, W6AIN, Mac, N6YV, Gerry, W6NIR, Swede, N6CHL, Snannon, K6TNY, Eric, W6DU, Bob, W6BFH, and a visitor from the Stanford Radio Club, Stuart Neubaugh, WA6FSI.

There was considerable rag-chewing before the meeting really got underway. SEM gave a quick report on his trip to Seattle. His conclusion was that he spent the summer there—the whole day of it.

LNW had a stack of correspondence that he passed around to those who wanted it. Some was from the FCC regarding the licensing of K6YQT, with parts that had been forwarded by Bob, W6WQD, who was the station's trustee until his move to Virginia. SEM said he would take care of any problems that might develop. LNV reported the insurance company wanted to move the Club trailer out of our general liability policy—it met with no dissention. He also mused that something should be done about advertising the Auction and Flea Market but was called out of order. He leand back and relaxed. But not long.

He asked what progress had been made finding a CCRC representative—one of our channels for advertising. Gerry, NIR, announced that Jerry, W6ARA, had been approached and looked forward to taking the job.

BFH, with an eye on page 3 of PAARagraphs, asked if a Board Member had been selected to fill Terry's, N6RY, shoes. It was announced that Dave, KB6WP, had been chosen and had accepted the post. All were pleased.

SEM asked LNV what he was thinking about for the Auction and Flea Market. Gerry wondered if we wanted to use the same format on the hand-out. It was suggested that it be changed (from what you see in this issue) to something to be developed by Mac, YV.

The same general program format was to be maintained this year. Tables still at \$3.50, and one important change: the maximum commission on one lot will be \$5.00 with 10% continuing for items sold for less than \$50. This change was made to continue the quality auction items that we had last year.

Methods and places to advertise were discussed to ensure all interested are informed of the event.

Swede, being the biggest of the bunch, was selected to provide supplemental security of AMPLEX grounds.

The meeting broke up because this is all the room available.

UPGRADE CORNER: Bill McElhinney, our resident architect, received the call KA7LZI. He could have knocked us over with a fender if we'd realized who KA6LZI was on Field Day by going into the Novice tent and asking to try for a contact.

Mike, KA6GRU, upgraded to General a few days too early to put him to work at Field Day. Talking to Seattle will be a breeze now with more bands and more space in the bands available.
Congratulations to both of you.

FIELD DAY CORNER: Write an article about Field Day? O. K., but from one not really involved in the whole thing...it's bound to be inadequate.

Those who could do a better job are busy sorting and storing equipment used during the last weekend in June. Who are the principals and who does the work? Those who don't have time to write.

When does F.D. preparation begin? about the second week of October because those who are instrumental in F.D. are also active in the social event of the year—PAARA's Auction and Flea Market—this year on October 11, at AMPEX.

Fred, K6YT, finished his visible F.D. activity by two weeks after the fact by hauling four truck loads of gear home for warehousing until next year. What happens to the stuff between now and June 26, 27 and 28, 1981, no one knows. But everyone knows that when it mysteriously reappears it will be in first class shape—the result of countless rainy-weekend winter projects. Last year Fred rebuilt a 60 foot tower most had given up as a loss. Hauled from Santa Rosa by Fred, surveyed and found wanting, he put out a plea on the 2-meter net for aluminum strips, various thickness for different sections. A volunteer source presented itself. Did it, or didn't it produce? Hours of removing rivets, cutting strips, drilling holes, re-riveting...most of us wouldn't do it for our own tower but after hours of work, PAARA gets a new one, probably no heavier but stronger than when new.

As needed, Fred maintains the power plant used at Field Day. Last year it was almost rebuilt—other s supplied some help but the bulk of the hours were Fred's. He runs the generator in weekly tests, maintains it when necessary, and the success he's had with BEACON CORNER: Below are listed the Ten-Meter Beachons I have heard in the past few months. There are supposed to be others but I have not heard them.

Fred's efforts are not alone. Cam, K6RU, appears to be the antenna specialist. Cam, with Fred, Eric, W6DU, and Bob, K6SEM, spent hours of their "free" time building beams and arrays just for the annual event. Last year Cam was heard telling what he could do with Ed's, W6KJI, windstorm damaged Quad. This year it turned out as a high quality, high gain 15 4-element beam for phone—and Cam is a CW man.

Scrounging material is the job of many. A coffee can full of plugs of various shapes and sizes, A box of muffin fans, willing hands to cut scrap pipe and reinforcing rod into stakes, specially fabricated parts, Anyone who has done it knows how long it takes and how frustrating it is to find the missing link of a project.

Special projects? Every point counts. Bob, W6BFH, handled publicity and built a windmill. Shannon, K6TNY, put together the bicycle power as a backup for the windmill, and Shannon and Irene, WB6RAF, know how many hours of fun and frustration went into it. Each year we see improvements in the appearance, quality, and operational effectiveness of the satellite station, the culmination of the previous year's work by Ed, WB6FCH.

Planning? It's not a slipshod affair. Who plans the strategy of F. D? Once the warehoused equipment

is ready the logistics of deploying it is enough to tire old men and discourage youngsters. Fred's truck is the prime mover. Fred, Bob, Cam and Ken WA6NYB, and a dozen others, wrestle the stuff around and get it in position and operating. Tents or trailers are put in place; food for the "workers" is arranged for by Irene, with contributions by KUL's of Fred, SEM and a number of others. And operation planning: who works which band and when? Analysis of previous year's experience and late propagation data go into the decision after hours of research and discussion by Fred, Cam, Bob and Eric.

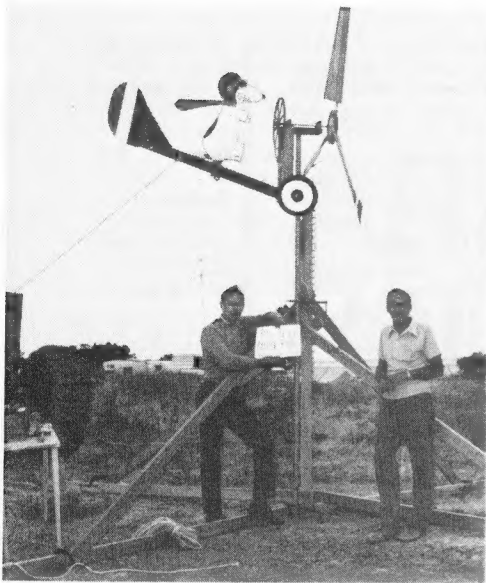
Those who were recorded in attendance this year were: WA6NYB, KA6KYA, W6AIN, K7UDG, K6RU, K6TNY, K6MPN, KA6IZZ, K6YT, WB6WBK, K6SEM, W6ARA, KA6CUG, K6XO, K6FS, W6BFH, AACUO, N6CHL, N6YV, WA6FHC, W1ARR, in the set-up crew on the 27th, most of whom joined WB6RAF, KA6JWA, N6CCM, WA6AZP, KA6HEB, W6NIR, GI3OEN, KA6LZI, WB8EAS, WA6SZX, WD6CVP and WA6NCX on the 28th and 29th. To those omitted: our apologies and we look for a higher profile from you next year.

In all, Field Day was a great event: 10% more contacts than the year before. It was the accomplishment of twenty or so workers and a dozen or more operators. Win, lose, or draw, PAARA done good; everyone done did it good.

The prime project for next year: Fred leans back in his chair, hands folded behind his head, and begins to mutter about a tower trailer for the 60-footer he rebuilt last spring. The plans are forming. Those interested in helping.....

Frequency	Call	Remarks
28.1750	VE3TEW	Hard to hear because of QRM.
28.2050	DL6TGI	On the hour, and on half hour seems to operate at 28.2000.
28.2075	WD4MSN	Florida, replaced N4RD.
28.2100	3B8MS	Mauritius
28.2150	GB3SX	I think this the oldest one.
28.2200	5B4CY	Cyprus.
28.2250	VE7TEW	This is new.
28.2350	VP9BA	A raunchy F.S.K. signal but most frequently heard of all.
28.2380	OA4CA	Lima, very strong signal.
28.2460	EA2HB	Very weak signal.
28.2570	DK0TE	
28.2740	ZS6PW	Weak signal.
28.2800	YV5AYV	Strong signal.
28.3150	ZS6DN	Interesting—it ticks like a clock between I.D.'s.
28.8800	W6IRT	L.A. area 10-10 group.
28.8900	WD9GOE	Illinois.

The band has been pretty dead lately but you can hear two or three of these most any morning.
de Ralph, WB6NNL



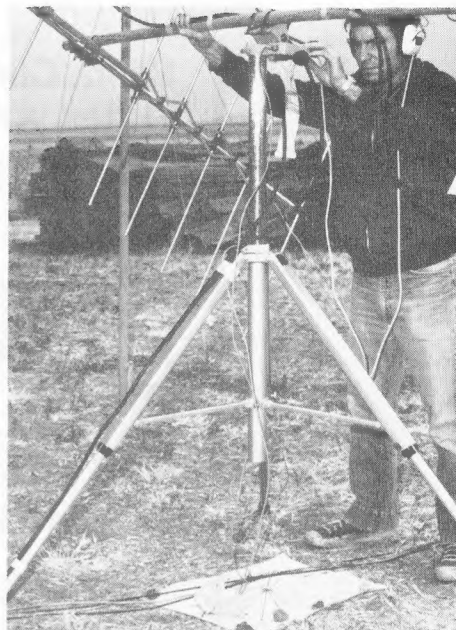
Above - Windpower, a S.P.A.D.

Upper Right - Howgozit?

Right - That's a dupe, pal

Below - The whole Yellow Turkey team,
1805Z Sunday, June 29.





Above - Oscar/Oscar/Oscar

Upper Left - Once a Novice . . .

Left - Ten is HOT

Below - Getting it up on Friday

Photos and captions by Steve, K6FS



Santa Clara County Amateur Radio Association
invites you to the

ARRL PACIFIC DIVISION CONVENTION

August 29, 30 & 31 1980

at the *Marriott* Hotel Santa Clara

Santa Clara County Amateur Radio Association Post Office Box 6 San Jose, CA 95103

FREE ENERGY CORNER: It evolved in the Middle East in the 900's, spread to Europe by the 1100's and came to PAARA in 1980. The latest model took 754 hours, 108 asperin, 13 gallons of gasoline, suggestions from a few, encouragement from many, a trip to the hospital, various minor gouges, nicks, scratches, abrasions and a number of sore muscles. A small price, says Fred, K6YT, for reinventing the windmill.

In April, Fred asked on the 2-meter net if anyone would like to satisfy the League's requirement for an alternative energy source for Field Day—get a free transmitter using bike, solar, or wind systems. After a long enough pause, Bob, W6BFH, said he'd like to try a windmill, and Shannon, K6TNY, said bike power would surely work.

Bob started looking through magazines, going to the libraries and asking for ideas and help but found little specific information. Cloth sails seemed to be the vogue in Holland in the 1100's and at Bear Lake, Minnesota in 1977. A set of four sails was cut from scraps of sail cloth, fastened to spars, placed on a shaft, mounted on a platform, set up in the backyard, and they turned slowly in the 5 mph "gusts". Left unattended for an hour, the whole thing toppled over into the roses and onto the fence with no measurement of wind speed, r.p.m. or power output.

Repairs—except to the roses—were quickly made.

Various D.C. motors, an automobile generator and an

alternator were investigated for power output vrs. r.p.m. The alternator was chosen as the most likely to succeed because of its light weight and low friction but in order to generate 15 to 18 volts it was necessary to rewind the armature. One phase was rewound with 10 turns replacing four.

During the rewinding process, experiments with cloth sails continued and an estimated 30 to 40 rpm was made for winds of 15 to 20 mph. This necessitated an increase of 40 to 50 by way of gears, sprockets and chains, or belts. Gears were not available but sprockets and chains aplenty were from Gerry, W6NIR—left over from a family of experiment-ive children. These, with supplies on hand, would give a 30:1 ratio, not enough to achieve the 1800 rpm necessary to drive the alternator. And friction through the system was quite high.

Memories of farm wind-driven electrical plants and descriptions of more modern systems in catalogs suggested high speed blades of airfoil design should be tried. Lee Prior, a local resident, had built a set of blades but they didn't develop the 2-kw he wanted. He described the airfoil, chord, angle of incidence along the "wing", and the length, for a high speed blade.

Two four-foot blades were fashioned using an old boat-building technique for obtaining compound curves with square strakes running the length of the boat (blade). They were given conduit spars and

mounted on a hub, to a shaft set on a 2 x 6, and the 2 x 6 mounted to a pipe with a floor flange. When erected, the blades turned majestically at 12 to 25 rpm in the back yard.

Picking the whole thing up, it was moved to the front yard where 4 to 7 mph breezes were gusting to 12. The wind caught and things really began to whirl. Holding the 10 foot pole supporting the shaft and blades became a problem and 60 rpm was quite aplenty so the thought was to abandon the cloth sails. Above 60 rpm the noise of the blades sweeping past Bob's ear was a little disconcerting. Bob felt he had put himself in a position he shouldn't have and that better preparation could have been made. As the pole was lowered, trying to keep the blades where they should be, one of them caught his forearm sweeping away a patch of skin down to the meat. Six weeks later it looked like the patch would be hairless for ever-more.

Convinced blades would do the trick, a third was made, with the idea of going to four, five or six, if need be, to develop sufficient power.

Time for another test. This was made at the Field Day site with a sturdy base. Blades, Alternator, and all set to go. The blades were turned away from the wind and everything began to turn—blades, pulleys, chains, sprockets, alternator. He stood watching it go as the blades unscrewed themselves from the shaft and flew off down the berm, two of the breaking as they cartwheeled away.

Back to the drawing board: He rebuilt the blades and secured the hub and main drive pulley to the shaft. Off to the site for another try. Everything set. He turned the blades away from the wind and they began to go. Measured the wind at 12 mph. Blades turned faster and faster...and what a racket. Chains in sprockets and over pulleys, alternator singing away. Just as he bent down to load the alternator and slow things down—the blades were

making about 100 rpm and the alternator 3000—he heard a shot—and then another and another. Then an explosion. It has been described as looking as if someone had shot a pheasant with a 12 gage shotgun with a heavy load. Chunks, pieces and splinters of blade sailed higher than Carl's barge, into the Bay, and for 50 feet either side and downwind from where they had been.

The explosion was when one of the spars grabbed the alternator drive chain, which had jumped the sprocket and broke, throwing it about 75 feet to near Carl's office.

Exhilarated, he knew it would work. Make two new blades and rebuild one, each 36 inches long, fiber glassed for strength. Beef up the structure. Make a fin to keep the blades into the wind. These tasks completed, the monster was set up in the back yard and it acted as if it wanted to work. But now it was getting heavy. Lowering it he snagged the heel of his hand, opening it pretty well. Being his eating hand, he went to the hospital for at least four stitches but none were necessary.

Healing time was spent looking for a 24-volt D.C. ceramic magnet field motor. Shannon, K6TNY, clued him in on one and he looked at it. Too expensive. His Mustang Shop Manual described the ceramic magnet windshield wiper motor, so off to the junk yards for one but they were the same price as Shannon's find. Back to the Source and they were gone. But he was ready to settle for almost anything, and did. What it is only the manufacturer knows, and no one knows who he is. It developed a voltage when the shaft was spun with the fingers. Time was getting short and the beast had to work.

Encouraged by the high speed of the blades during the catastrophic test, the second set of sprockets was removed, leaving a 9:1 ratio. A belt was substituted for chain and another on-site test made, this time with Swede, N6CHL, along to help one-handed Bob

1952 ANNUAL 1980

PALO ALTO AMATEUR RADIO ASSOCIATION

AUCTION & FLEA MARKET

SATURDAY OCTOBER 11 10:00 a.m.

AMPEX Cafeteria, Next to Bldg. 1 Bay Road
REDWOOD CITY, CA

CUT AND PASTE CORNER: Please make the following changes to your April Roster:

David Harper	WB6JFH	Route 1, Box 287-B	Deer Park, WA	99006
Walt Harper		Route 1, Box 287-B	Deer Park, WA	99006
Bill McElhinney	KA6LZI	otherwise no change		

wrestle things around.

The wind was dead calm. Not a ripple on the Bay. After getting things set up a cat's paw or two could be seen up near the bridge. The ripples spread southward and a breeze picked up. The blades started to turn. Soon the wind was blowing 10 to 12 mph and we heard a tick...tick..tick,tick. and began counting when the seam in the belt came around. Swede counted 47 in 15 seconds and Bob 35 in 10. The output voltage went off-scale of the 15 volt meter somewhere between 188 and 210 rpm of the blades, 1700 to 1900 rpm of the motor, marked only with a self adhesive label—"o.k. at 1800 rpm". What that notation was intended to convey no one knows but he who wrote it. It apparently meant what it said and said what it meant.

The frosting was Snoopy, done by Virginia, Ed's W6AIN, XYL, who inspired the fin and rudder. Snoopy took after the Red Baron and 100 F.D. points for PAARA in his Simple Pollution Alleviating Device (SPAD).

* * *

ANTENNA PARTY CORNER: Dave, WB6JFH, had a tower-lowering-going-away party July 12. Supervising were Ken, WA6NYB, and Paul, WA6IJP, with a little effort help by Ed, W6AIN, Gerry, W6NIR, Jerry, W6ARA, Bob, W6BFH and K6EHS.

Starting about 10 a.m., Ken and Paul donned their safety belts and disappeared while the others fortified themselves with coffee and doughnuts.

Occasionally someone "up there" would lower a note on a rope and ask for something which would be attached. Two sharp jerks (on the rope) and it would disappear, while below, six jerks (on the rope) would keep the ground crew in stitches.

No skinned knuckles—at least not too bloody—and no apparent mishaps in the operation which concluded in a neat bundle of aluminum tube and pipe in the middle of his back yard, about noon.

Dave wishes to thank those of the takedown party which, by the number of doughnuts supplied, could have been larger but by the number of doughnuts left, made the group just right. He also expressed his feelings about what PAARA had done for him during the past eight years.

Dave is one of our most active members—name a communications problem and he was there to help. A PAARAgaphs contributor, a 2-meter net controller, always in cheerful voice when no one else wanted to do it, a Field Day participant—all will be missed. Listen for Dave on the bands after his move July 25—and keep bugging Walt to get his license. '73, Dave and Walt.

+ + +

PARADE CORNER: PAARA members performed their annual communications aid to the Redwood City 4th of July parade without a glitch again this year. Seventeen

operators and ten stations lined the parade route that wound through downtown Redwood City.

Dick, K6ANN, remarked that it was the smoothest operation in the fifteen or so years that 2-meters has helped announcers at various points along the route keep parade elements in order.

Those who helped include W6DVB, WB6RAF, WA6RAG K6FS, W6AIN, K6JBR, WB6IML, KB6WP, K6TNY, K6FNQ, N6BOH, N6BYL, W6FTW, K6MPN and WB6JFH.

All look for a bigger and better parade next year.

!!!

CORNER OF EXPLORATION: Post 599 has been so busy lately that we have not had enough time to sit down and write about our activities. (hi) Summer is upon us and the entire Post is enjoying the time we have before school starts again in September.

Topping our list was the Scout-C-Rama, which occurred way back on May 10. As expected, Post 599 took the blue ribbon. Our impressive display included the 65 foot tower with tri-band beam, the two FT-101-ZS twins, a complete 2-meter station, and a large collection of QSL cards from distant lands.

Activities continued on June 8 with the Western Wheelers "Bike-A-Thon. 80-meter phone and 2-meters were used. Special thanks belong to Walt, W6ASH, for the use of his repeater on 147.27. The hours ranged from 6 a.m. to 6 p.m. Five checkpoints were used with the base at Gunn High School.

As a final point, Post 599 is now proud owner of the call K6OTR. It will serve our HF and repeater station well.

'73. Jim, KA6IKX
John, KA6CUG.

" " "

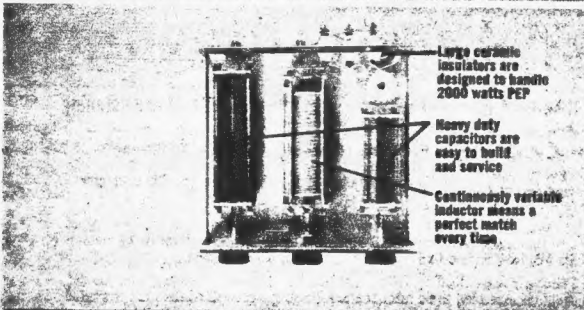
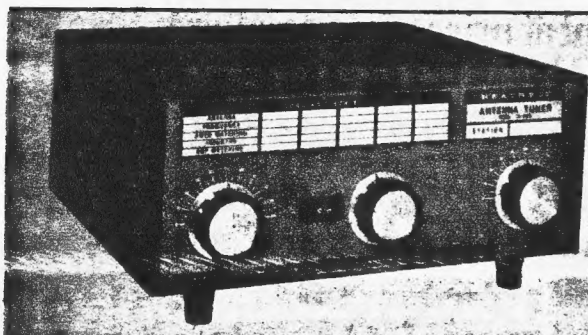
HONORS CORNER: At the April, 1979 meeting PAARA programmed Tom Ellison, of United Airlines, who talked about "modern" — five years from now — aircraft electronics. Tom has been presented the Volare Award by the Airlines Electronic Engineering section of ARINC for his contributions to the airline industry. All who know Tom are happy for him for the recognition he has obtained.

UNCLASSIFIED CORNER:

FOR SALE: Kenwood MC-50 dynamic mike with stand. Brand new. Half price at \$25. Also have Rohn 9ft tripod tower for sale at \$10; used only for one winter while waiting for my 45' tower to arrive. Call Leon, W6KTP, 494-2613

EDITOR'S CORNER: If this issue is incoherent it is because it was written between periods of chasing Sweed's squirrels out of our apricot tree—and trying to contact elusive KA5DQR.

One more little unclassified corner item and it would have filled the page.



Tied to one band? Use dipole or long wire 80 through 10 meters with the Heathkit 2 kW Antenna Tuner

\$159⁹⁵

- Accepts both balanced and unbalanced feed lines
- Continuously variable inductor gives you exact matching
- Even write in hand settings on the erasable front panel

You'll like the way the Heathkit SA-2040 2 kW Antenna Tuner helps you radiate more of your signal by maximizing power transfer from your transmitter to your antenna. It helps you reduce TVI, too. This Tuner gives you the versatility of using a built-in 4:1 balun for balanced feedlines, or unbalanced feedlines, or long wires.

A continuously variable inductor — from 3.5 MHz to 30 MHz — gives you an infinite number of impedance settings, assuring precise antenna matching, and makes the SA-2040 ideal for MARS operation or the recently approved new band allocations. A convenient counter on the front panel indicates inductor settings. The Heathkit manual includes a chart giving you high-, mid- and low-band settings on each HF band, plus a full page logging scale for recording intermediate settings. Write your most frequently used settings on the SA-2040's erasable front panel.

Silver-plated straps and roller contact assembly minimize RF loss at high frequencies. And large ceramic feed-through insulators withstand high voltage RF. This Tuner can handle up to 2000 watts PEP on SSB, and 1000 watts on CW. SO-239 connectors allow incorporation into your 50 Ω system.

This easy-to-build kit is a two-evening project. And when you've tightened the cover, personalize your Tuner with stick-on numerals and letters that let you add your own call sign to the front panel. The rugged black metal cabinet measures 5 1/4" H x 14 1/4" W x 13 3/4" D. Compare this Tuner with the competition — match power handling capabilities, features and price. You'll see why the SA-2040 is your best buy.

Kit SA-2040, Shpg. wt. 15 lbs. \$159.95
HDP-3622, 3-ft. RGSU jumper with PL259 connectors, Wt. 1 lb. 4.95

SA-2040 SPECIFICATIONS: Frequency Coverage: 3.5-30 MHz. Power Input Capability: Full legal limit. Input Impedance: 50 ohm at match. Impedance Transformation: 4:1 (balance-to-unbalance) balun. Output Impedance: Wide Range. Cabinet Dimensions: 5 1/4" H x 14 1/4" W x 13 3/4" D (36.8 x 14.6 x 35.2 cm).



AC Power Supplies for your Heathkit or other make Amateur Radio gear

① AC Supply for most 2-meter transceivers

- Power mobile transceiver plus amplifier to add VHF capability at your home QTH

The Heathkit PS-1175 supplies the necessary voltage and current to power the new VF-7401 2-meter transceiver/HA-202A amplifier combination (or most other makes of VHF mobile equipment) from a standard 120 or 240 VAC outlet for base station operation. Output voltage of the PS-1175 is internally adjustable between approximately 12 and 14.5 volts DC. A Darlington circuit provides exceptionally high gain for excellent regulation. The supply is fused for overload protection, and comes complete with cables and 3-wire line cord. The easy-to-assemble kit even includes a generous supply of solder. Order now and start getting double duty from your mobile transceiver.

Kit PS-1175, Shpg. wt. 15 lbs. 74.95

PS-1175 SPECIFICATIONS: Output Voltage: 13.8 VDC regulated (internally adjustable from approx. 12 to 14.5 VDC). Output Current: 10 amperes intermittent, 10 minutes max. (5 amperes continuous). Load Regulation: less than 1% at 10 amperes. Ripples less than 0.5% at 10 amperes. Power Requirement: 120 VAC, 50/60 Hz at 4 amperes, 240 VAC, 50/60 Hz at 2 amperes. Dimensions: 5 1/4" H x 6 3/4" W x 11" D.

② Here's the Supply to power HF equipment

- Here's the ideal power supply for your HW-101 or older Heathkit transceiver

The Heathkit PS-23 Power Supply will provide the operating voltages for the popular HW-101 Transceiver, as well as those necessary for the operation of many older Heathkit transceiver models and other types of Amateur Radio equipment. It has high voltage and two internally selectable low B+ taps. It also provides fixed bias and 12.6 filament voltage. The PS-23 features excellent bias supply filtering, plus extremely low ripple content. A circuit breaker in the primary circuit provides overload and short circuit protection. Instructions are included for either 120 or 240 VAC wiring. This easy-to-assemble kit will have you on the air in no time. And will give you many years of service.

Kit PS-23, Shpg. wt. 17 lbs. 60.95

PS-23 SPECIFICATIONS: High voltage output: 820 VDC no load; 700 VDC @ 250 mA $\pm 10\%$. AC ripple: Less than 1% @ 250 mA. Low voltage output: (High tap) 350 VDC, no load; 300 VDC @ 150 mA $\pm 10\%$, (Low tap) 275 VDC, no load, 250 VDC @ 100 mA $\pm 10\%$. Less than 0.05% AC ripple @ 150 mA, continuous duty to 175 mA. Fixed bias — 130 VDC $\pm 10\%$, no load; —100 VDC @ 30 mA. Power requirement: 120/240 VAC, 60/50 Hz, 350 watts maximum. Dimensions: 6 3/4" H x 4 3/4" W x 9" L.



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